

Time and Distance for Confinement of PMGF in Maize

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Objective

- Evaluation of time and distance concurrently.
- Relationship of time and distance, interactions?
- ~ 1 ha plot of open pollinated maize = 'inbred seed production'.

Methods

- Source: pollen borne 'purple kernel'. P1-rr and/or R1-nj. 1.2 ha (15m x 750 m).
- Receptors: 4 rows x 6 m. DK440, DK507, DK579 (94 – 107 RM).
- Male sterile border: 18 m wide.
- 5 planting intervals: -3 wk, -2 wk, 0 wk, +2 wk, +3 wk.
- Distances: 30, 60, 125, 250, 500, 750 m
- Regression of log-log curves. Ancova.

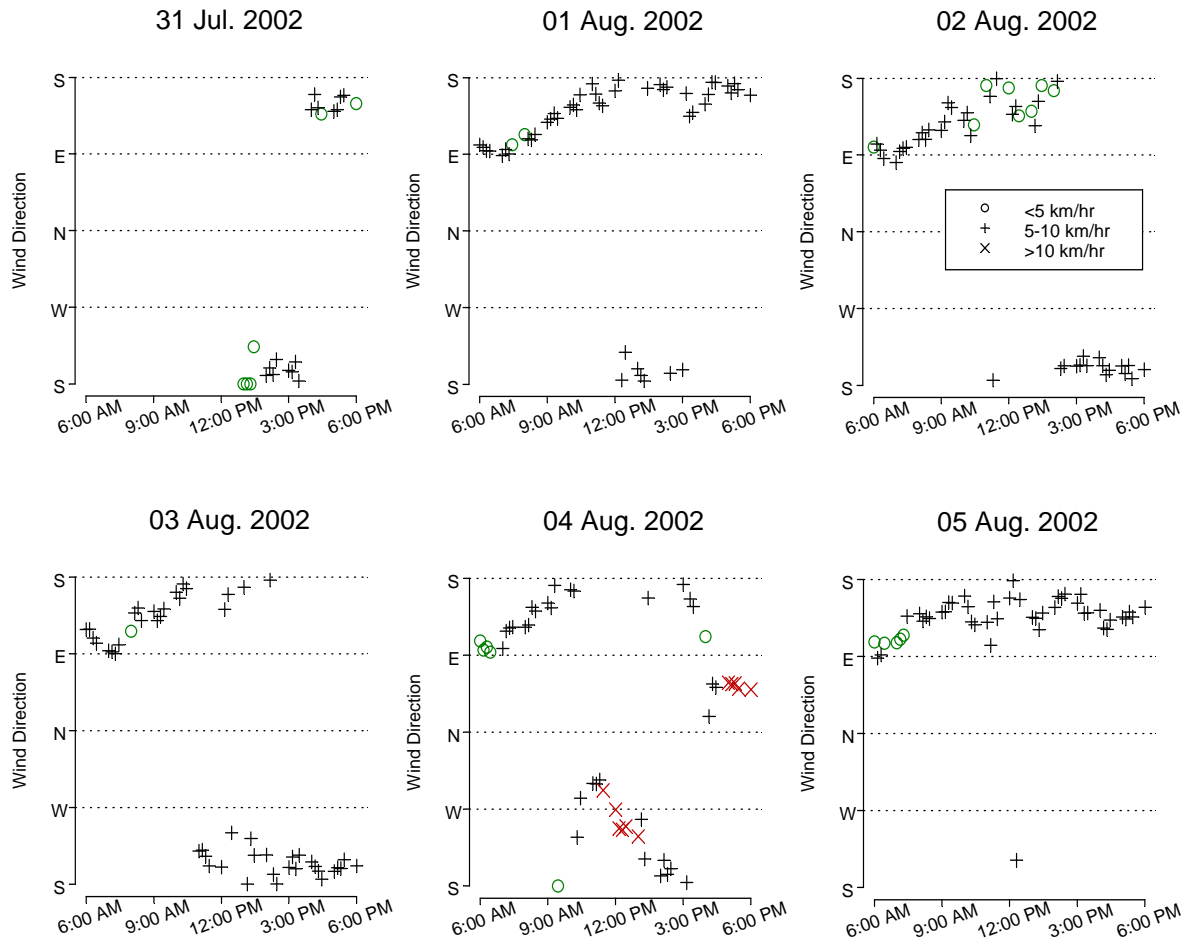




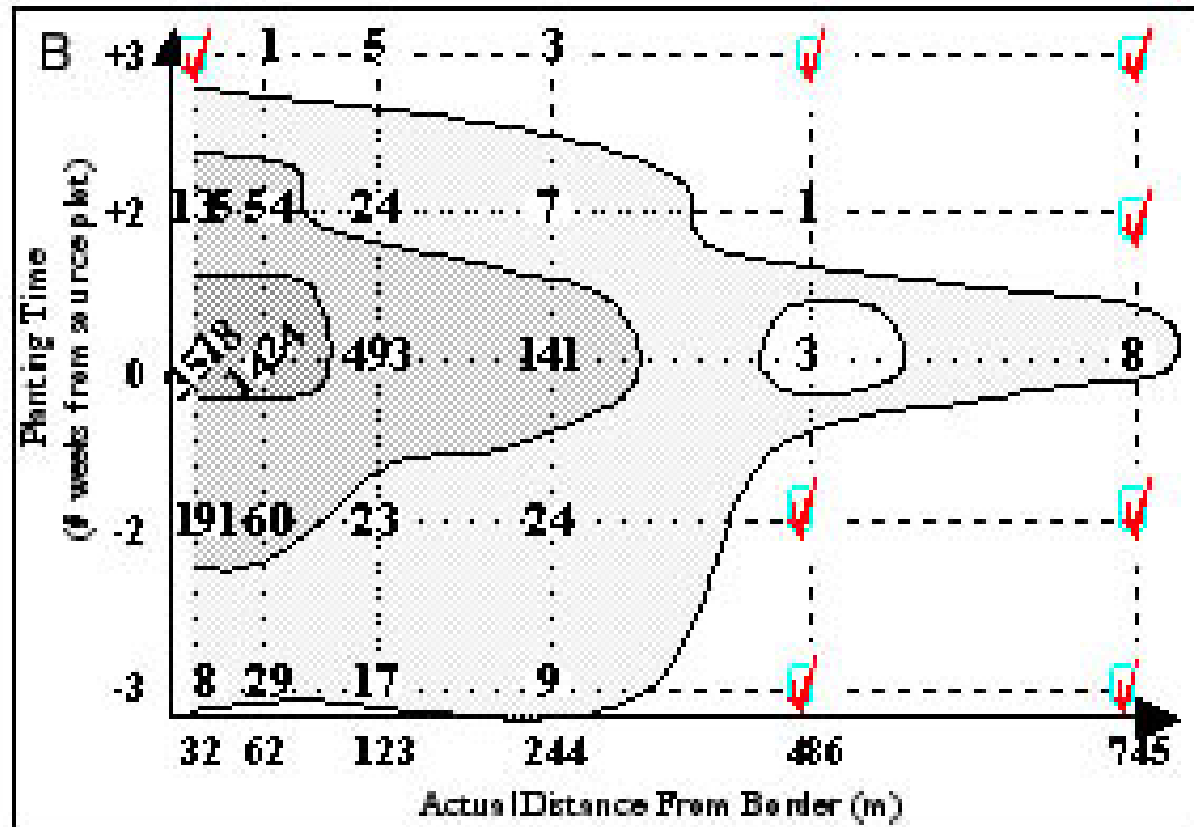
Flowering Synchrony

- Pollen: 30 July – 08 Aug – 19 Aug
- -3 wk silk: 13 July – 19 July: 0.08%
- -2 wk silk: 20 July – 26 July: 0.14%
- 0 wk silk: 30 July – 05 Aug: 43.1%
- +2 wk silk: 11 Aug – 16 Aug: 10.9%
- + 3 wk silk: 18 Aug – 22 Aug: 0.20%

Wind during 0 week silking

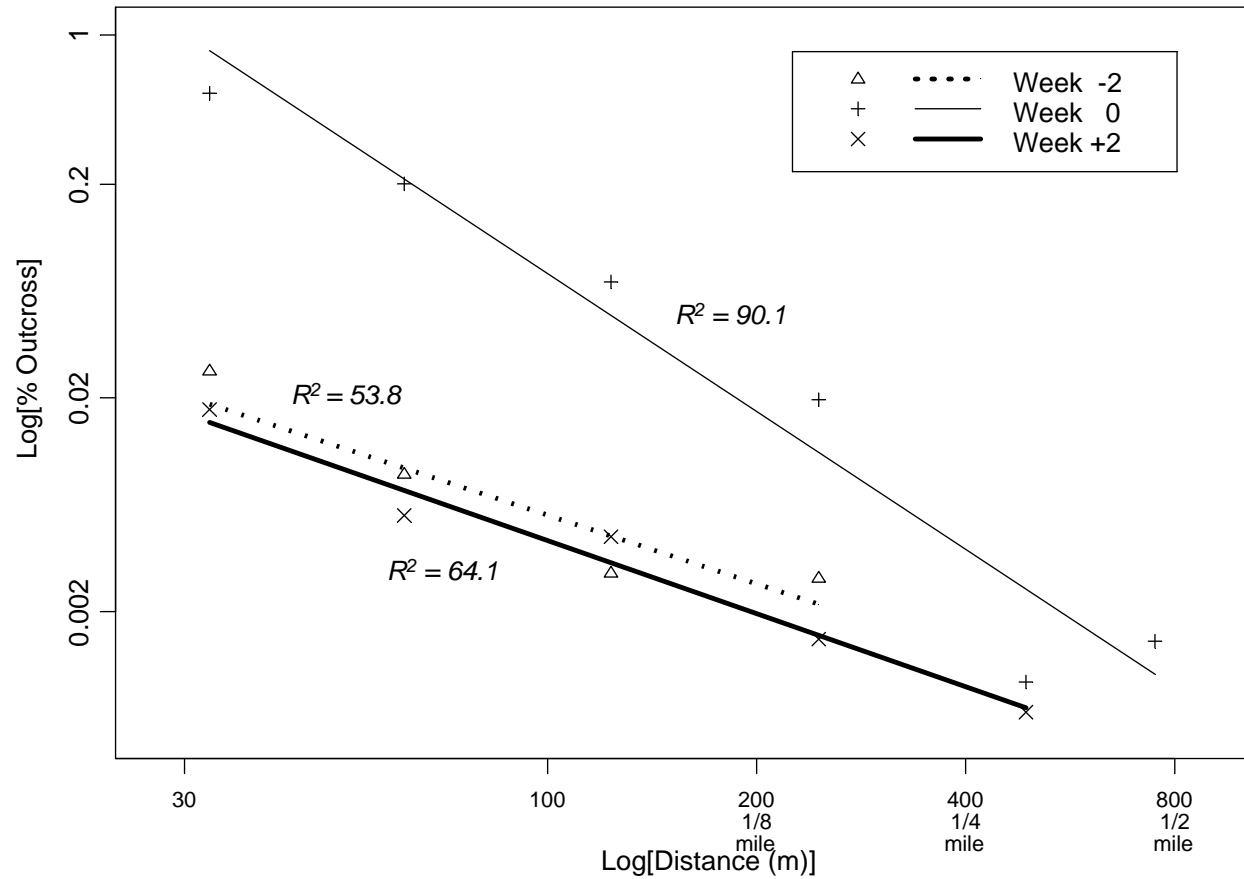


Gene flow in CA 2002



- = 0.1% to 1.0% outcrossing
- = 0.01% to 0.1% outcrossing
- = 0.001% to 0.01% outcrossing
- = < 0.001% outcrossing
- = no outcrossing detected

Gene Flow Gradients CA 2002



Ancova for CA 2002

- | <u>Factor</u> | <u>dfnum</u> | <u>dfdem</u> | <u>F-value</u> | <u>P-value</u> |
|---------------|--------------|--------------|----------------|----------------|
| • Time | 4 | 78 | 23.73 | <0.0001 |
| • T x D | 4 | 78 | 14.78 | <0.0001 |
- (335 gdu in 2 weeks, 500 gdu in 3 weeks)

Conclusions

- Time and distance both reduce gene flow
- Time requires heat to be effective
- Time and distance are not independent
- <0.01% outcrossing at 500 m
- <0.01% outcrossing at 62 m + 2 wk (335 gdu)
- USDA pharma maize: 1600 m or 800 m + 4 wk

Gene flow inside pollen source



Temporal separation CA 2002

